基于三维直线模组的物料搬运设备的机构设计

摘要：随着工业智能化，数字化的发展，物流仓储，机械电子 3C 等行业迎来了空前的机遇，工业机器人的研究和发展再次被提到新的重要位置，工业机器人的应用研究开启了多元化的时代，搬运机器人作为一个人重要的研究方向，对推动工业机器人的应用发展具有重要的意义。

本论文在对直角坐标机器人研究的基础上，以直线模组为载体，搭建了三维模组搬运机器人方案，确定了其布置形式和运动方式，在分析搬运负载的基础上，以反求设计的方式，对 X，Y，Z 模组进行了详细设计，并对关键部件进行了选型和校核，最后利用 solidworks 建立了三维模组搬运机器人的三维模型并对 Z 模组的后盖进行了机加工艺分析。

根据主要的研究内容，具体总结为一下几点：

（1）简单地介绍选题的背景和目的，叙述了搬运机器人的国内外发展情况以及发展趋势，同时直角坐标机器人技术从概念，组成以及应用等方面进行了介绍。

（2）分析了搬运机器人系统常见的构成形式，在明确本论文搬运机器人技术参数的前提下，通过对直角坐标常见布置形式优缺点的对比，确定了布置方案，同时也确定了其运动形式。

（3）在对外负载分析的基础上，以反求设计的理念，对 X、Y、Z 模组从使用条件，传动方式和动力等方面进行了详细地设计计算分析，并对关键部件滚珠丝杠，电机等部件进行了选型和验证。

（4）利用 solidworks 建立三维模组搬运机器人的三维模型，并对 Z 模组的后盖进行了分析和制定了其机械加工方案。

关键词：直线模组；直角坐标机器人；滚珠丝杠

Structural design of a three-dimensional linear module handling robot

Abstract: With the development of industrial intelligence, digitalization, logistics andwarehousing, machinery and electronics 3C and other industries have ushered in unprecedented opportunities, the research and development of industrial robots have once again been mentioned as new important positions. The application research of industrial robots has opened a diversified era. As an important research direction of a person, the carrying robot has an important significance to promote the application and development of industrial robots.

Based on the study of Cartesian coordinate robots and using linear modules as carriers, a three-dimensional module handling robot scheme is established, and its arrangement and movement mode are determined. Based on the analysis of the handling load, the reverse design Method, the X, Y, and Z modules were designed in detail, and key components were selected and checked. Finally, a three-dimensional model of the three-dimensional module handling robot was built using solidworks, and the back cover of the Z module was carried out. Machining process analysis.

According to the main research content, the following are summarized:

(1) This paper briefly introduces the background and purpose of the topic, describes the domestic and international development situation and development trend of the handling robot,. At the same time, the rectangular coordinate robot technology is introduced from the concept, composition and application.

(2) Analyze the common configuration forms of the handling robot system. On the premise of clearing the technical parameters of the handling robot in this paper, by comparing the advantages and disadvantages of the common arrangement forms of rectangular coordinates, the arrangement scheme is determined, and its movement form is also determined.

(3) Based on the external load analysis, based on the concept of reverse design, the X, Y, and Z modules are designed and analyzed in detail from the conditions of use, transmission mode and power, and the key components of ball wire The components such

as levers and motors were selected and verified.

(4) Use solidworks to build a 3D model of the 3D module handling robot, analyze the back cover of the Z module and formulate its machining scheme.

Key words: synchronous belt, linear module, motor, ball screw

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